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Title: PHELIX PLD-5 Proton Radiography

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# PHELIX PLD-5 Proton Radiography

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4 Dec 2013



# Abstract

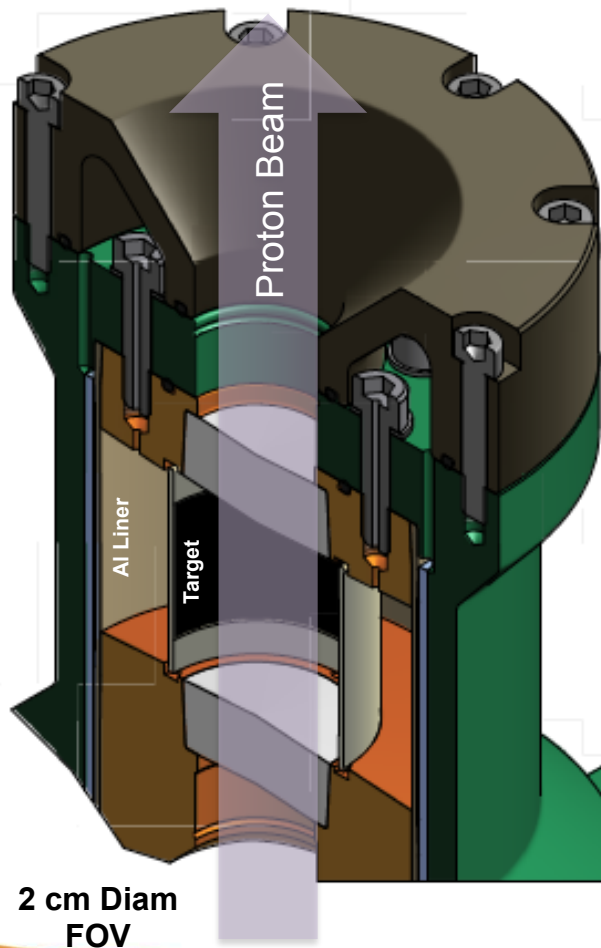
The first pulsed-power driven experiment diagnosed at the LANL LANSCE proton radiography facility was conducted on Dec 2 2013. The PHELIX (Precision High Energy-density Liner Implosion eXperiment) portable capacitor bank delivered a 3.2 MA peak, 10  $\mu$ s pulse to a load via cable coupled transformer. A cylindrical liner-on-target load configuration with micron size particle coating on the inside surface of the target was fielded. The experiment was self-confined. No vessel or catch tank was necessary. There was 100% data return including pRad imaging, flash X-Ray imaging, optical Faraday rotation for load current, as well as timing and firing diagnostics. 21 axial pRad images were acquired over a 40  $\mu$ s interval. This is five times the imaging data in one experiment as can be acquired with a flash X-ray system. High spatial and temporal resolution of features of interest are observed. Here is shown the liner-on-target load design, flash X-ray images from the proof-shot conducted in 2011, and the pRad images 2 Dec 2013.



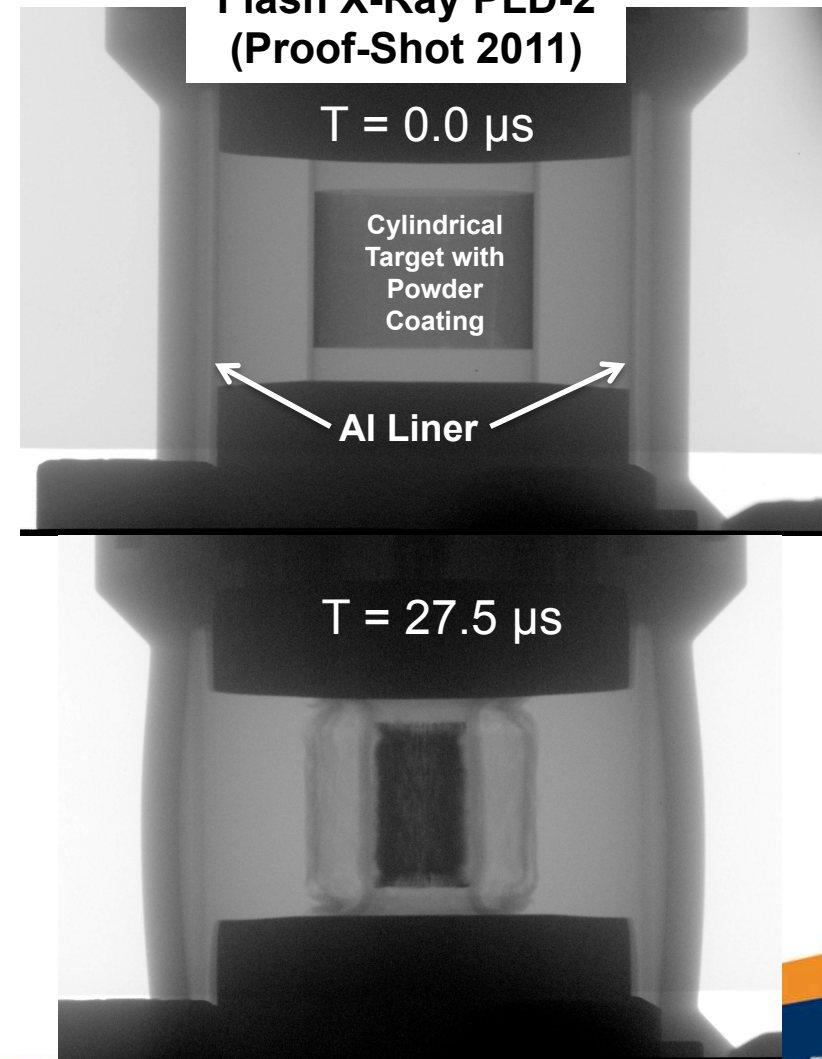


# PLD Load Design and Proof Shot Data

PHELIX PLD-2-5 Load Design

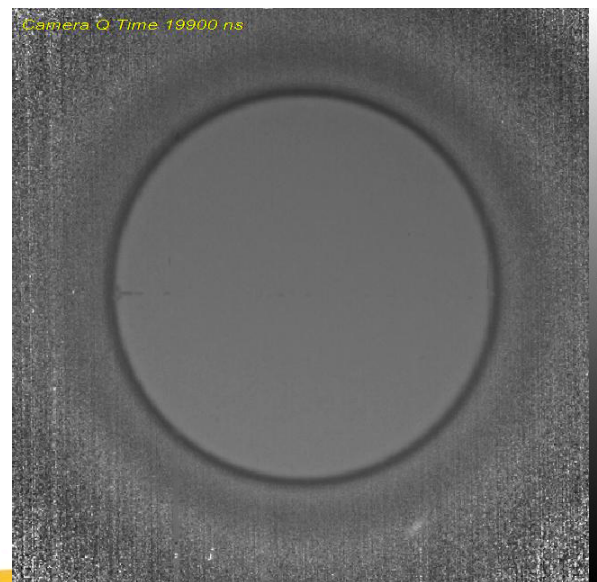
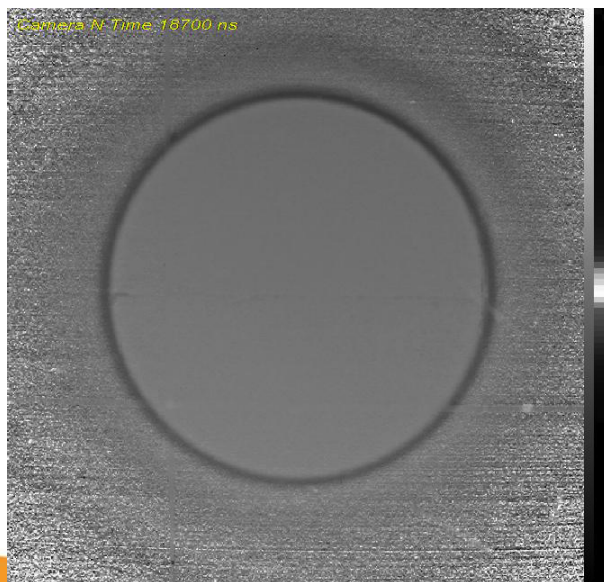
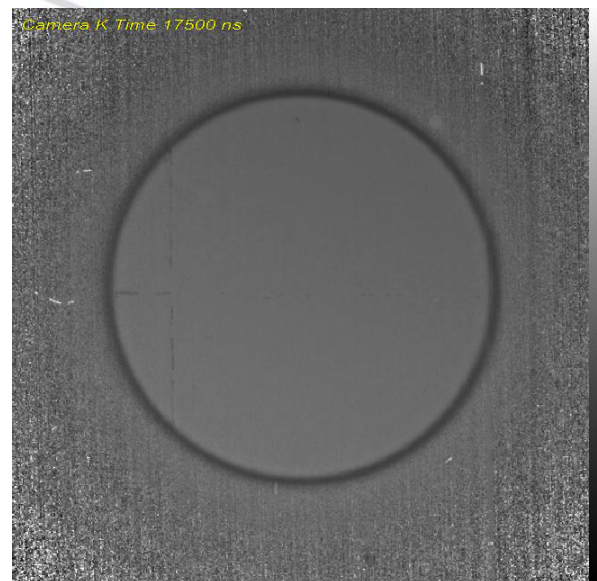
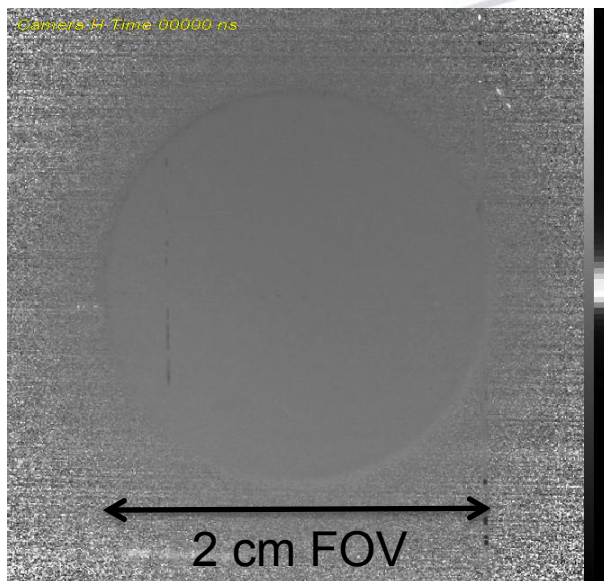


Flash X-Ray PLD-2  
(Proof-Shot 2011)

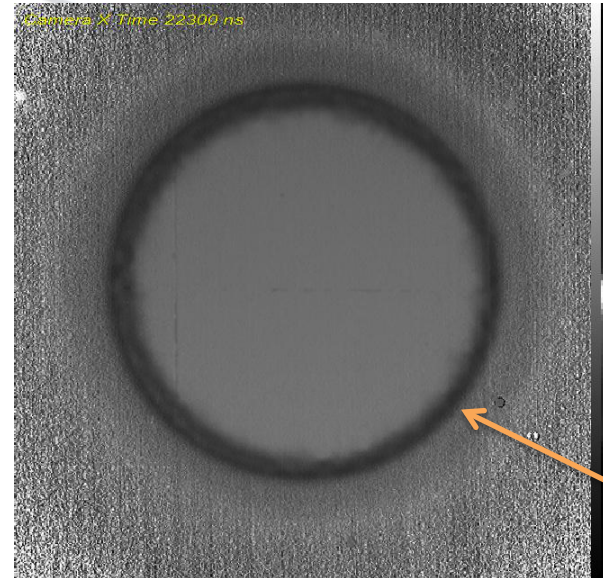
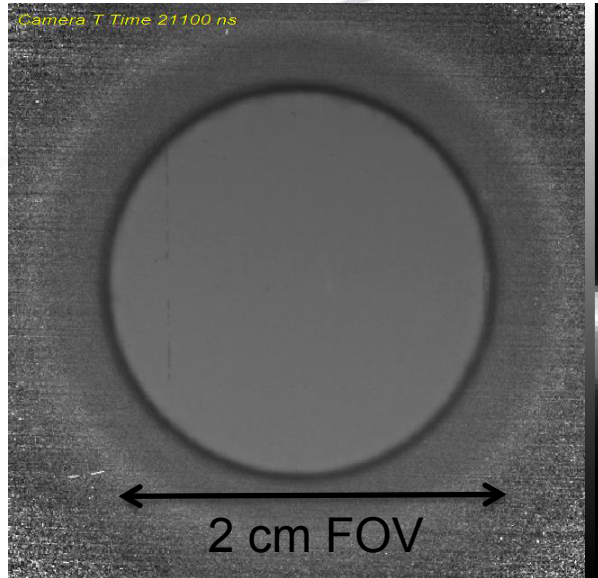




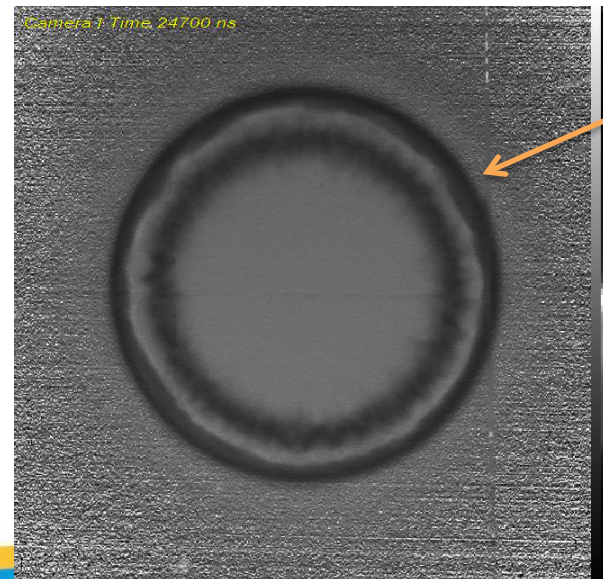
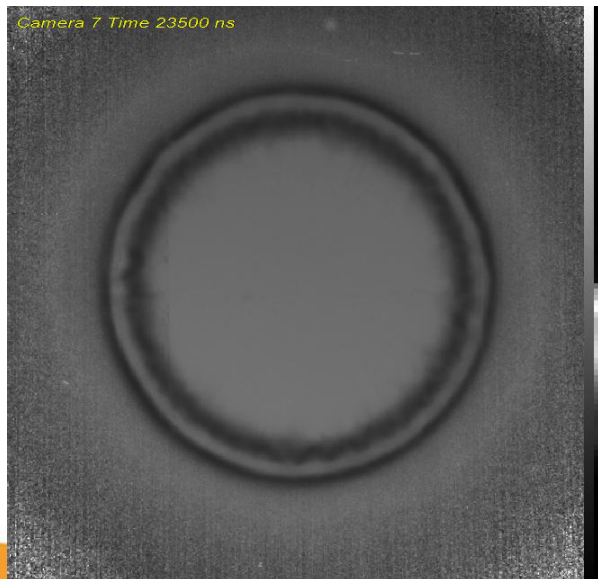
## Proton Radiography PLD-5, 2 Dec 2013



# Proton Radiography PLD-5, 2 Dec 2013



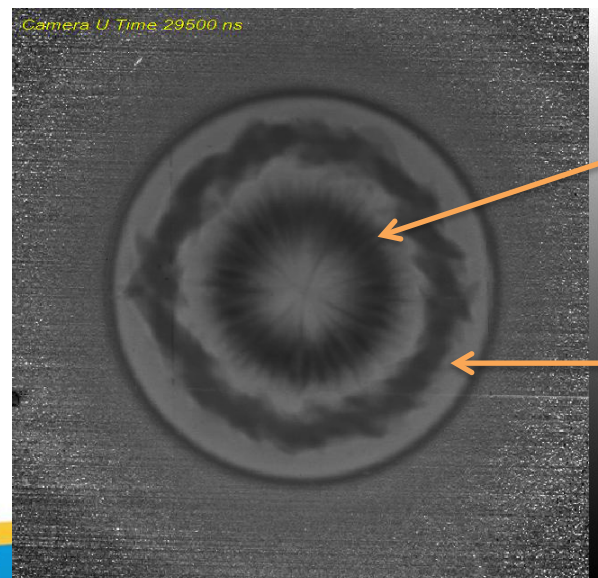
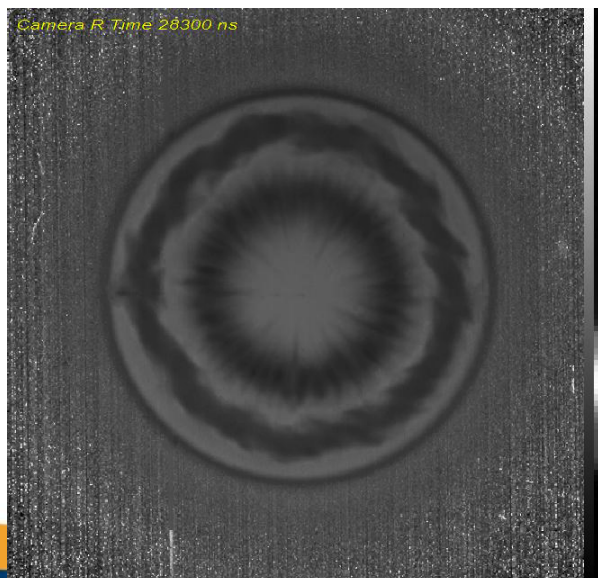
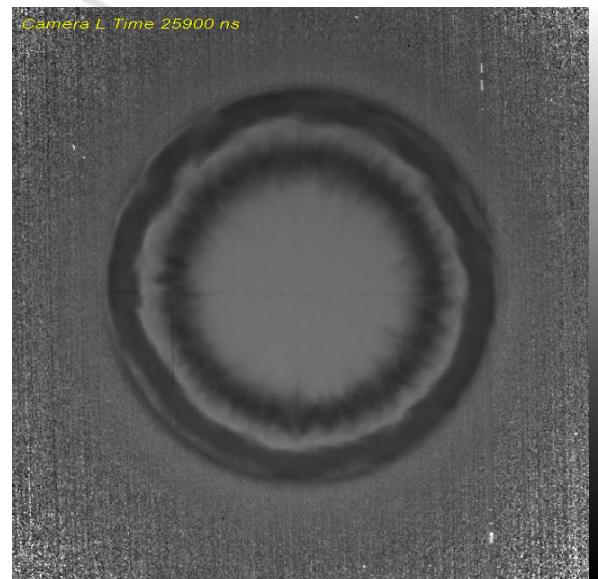
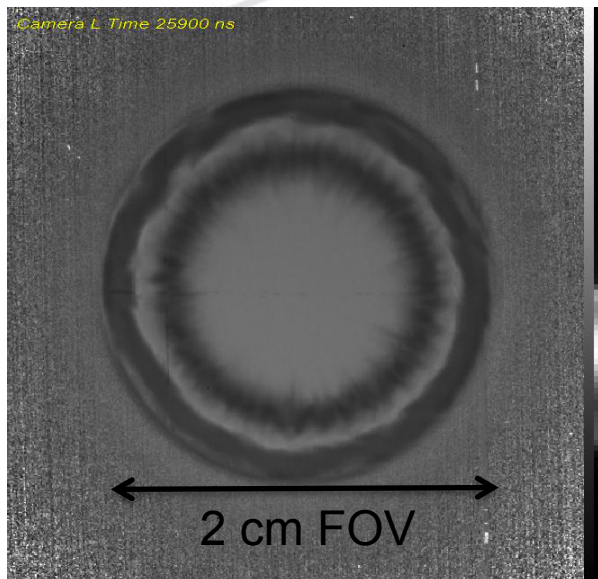
Shock Launched  
Powder Ring First  
Enters FOV



Target Cylinder  
First Enters FOV



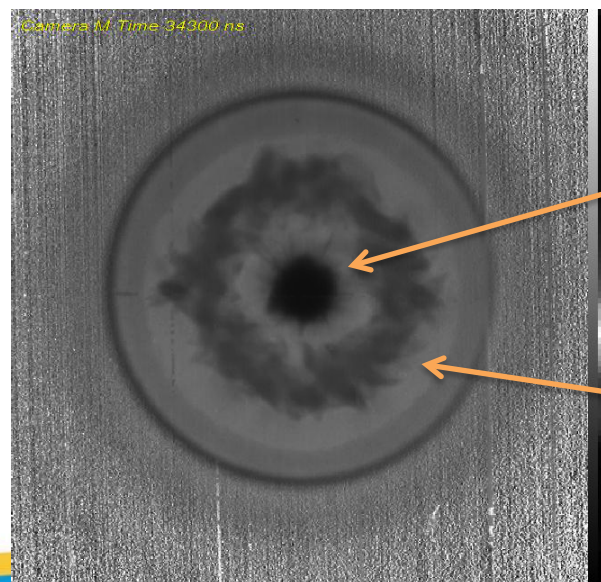
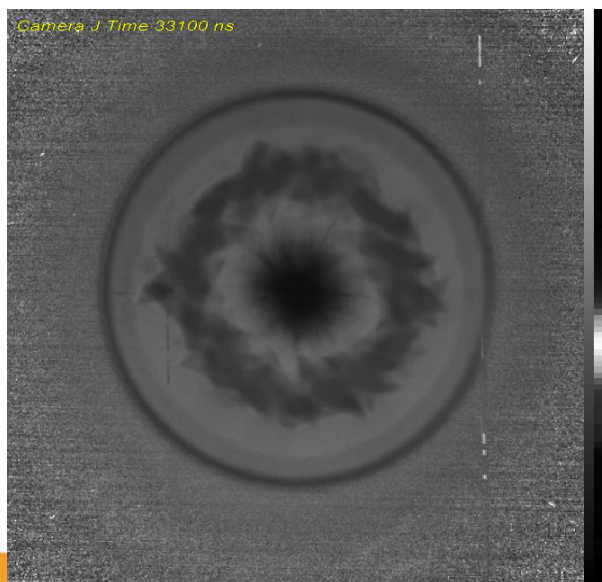
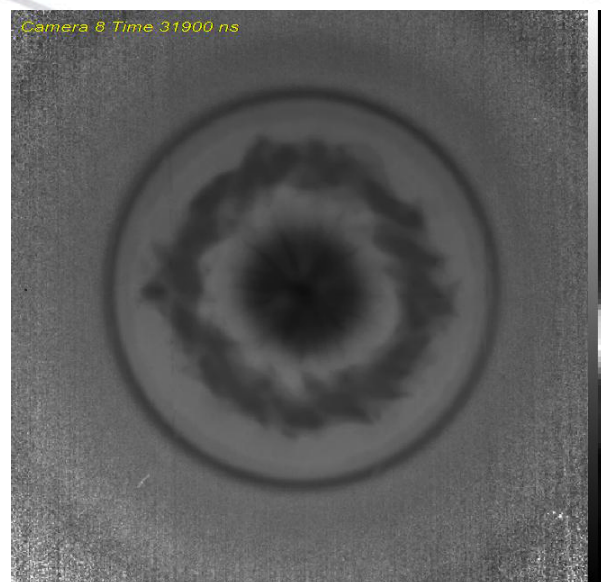
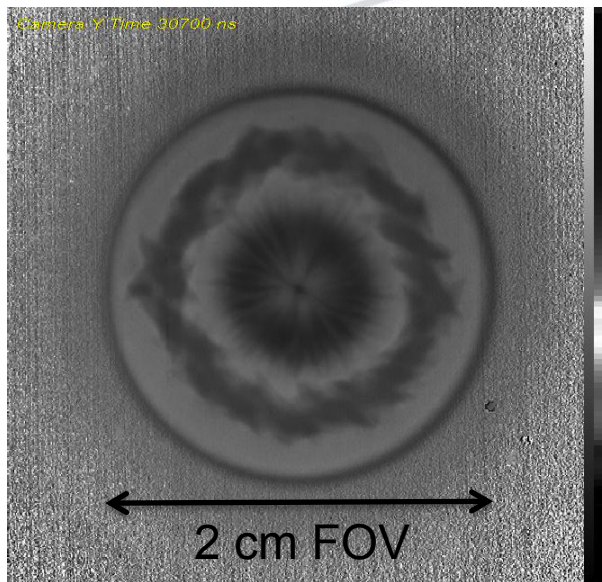
# Proton Radiography PLD-5, 2 Dec 2013



Powder Ring

Target Cylinder

# Proton Radiography PLD-5, 2 Dec 2013

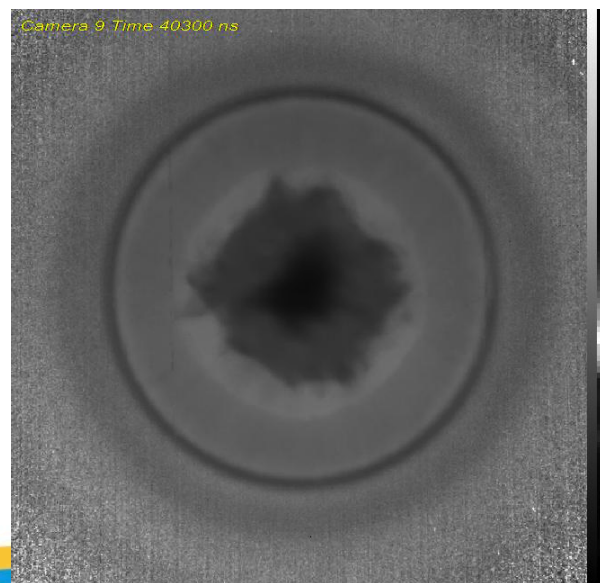
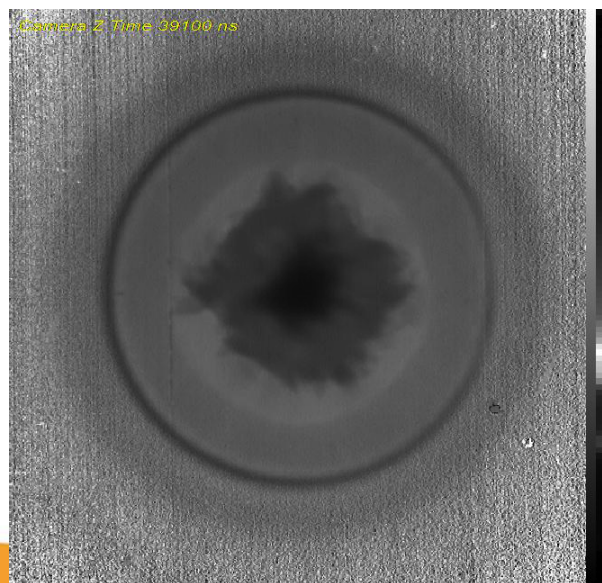
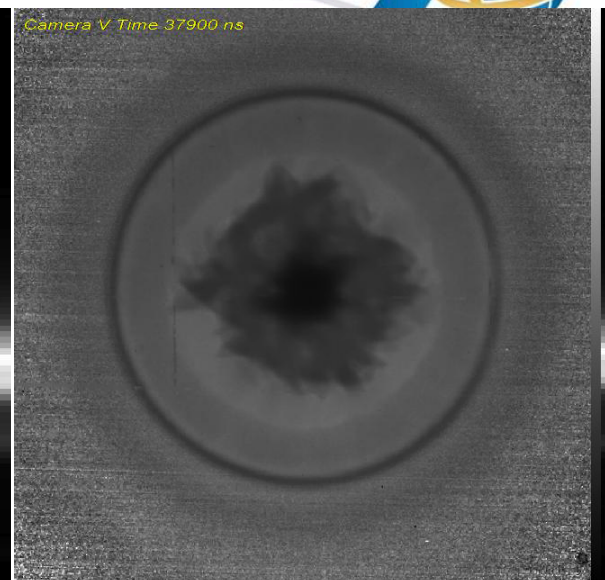
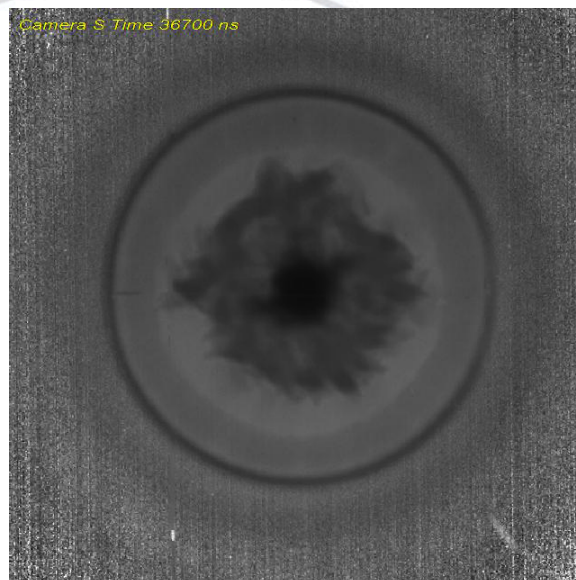
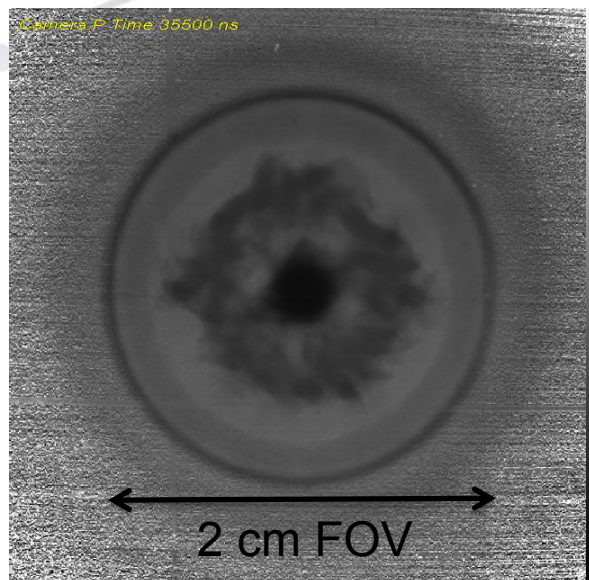


Powder

Target Cylinder



# Proton Radiography PLD-5, 2 Dec 2013



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